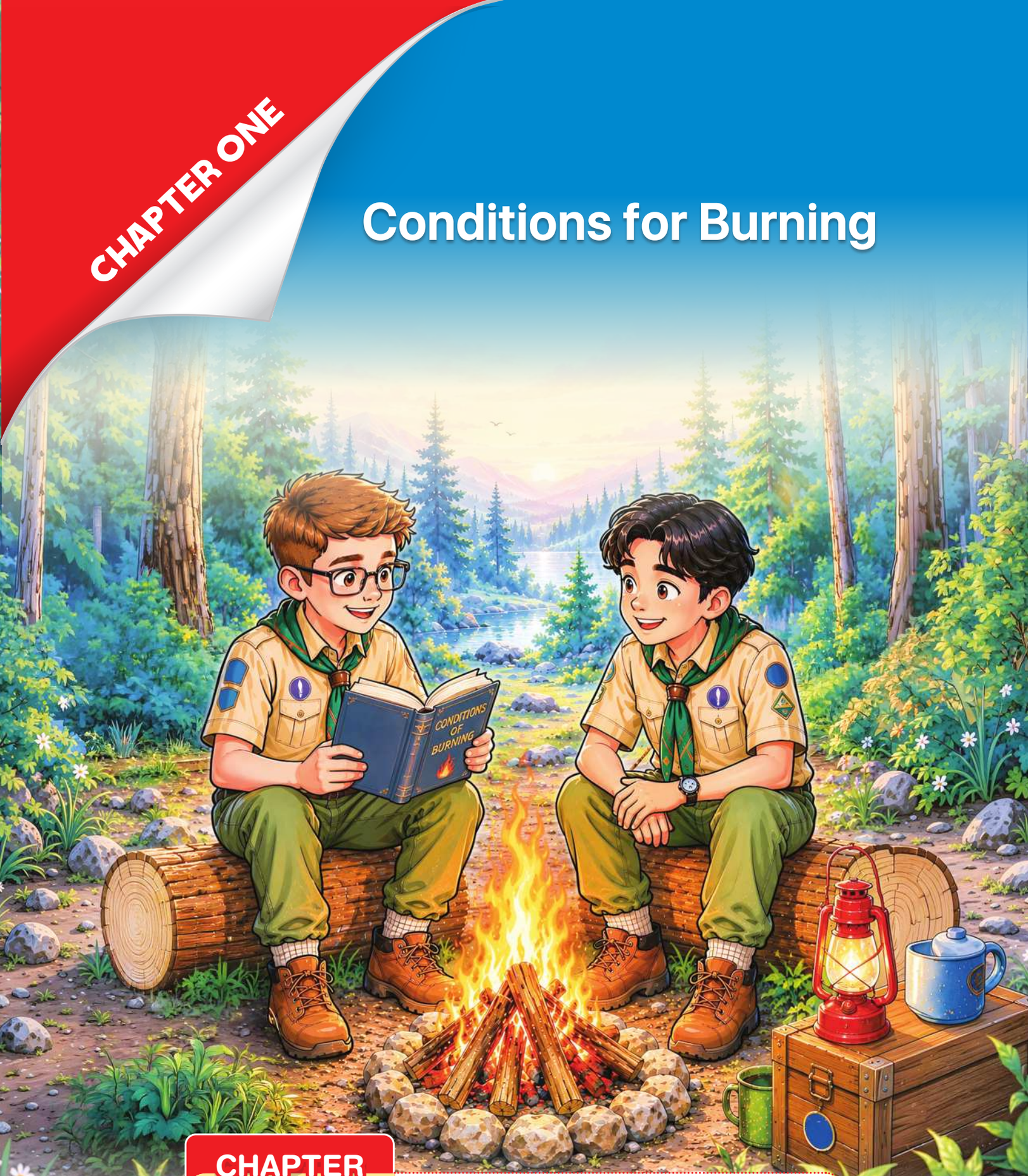
CHAPTER ONE

# Conditions for Burning




CHAPTER **1**


- Lesson 1 How Things Burn and Air.
- Lesson 2 The Role of Oxygen.
- Lesson 3 Air After Burning.



EL-MOASSER

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CHAPTER 1 LESSON 1

# How Things Burn and Air

Atmospheric air is present around us everywhere but we do not see it with our eyes, and this air has a role in many processes, including the Burning **(Combustion)**.

## What is meant by Burning

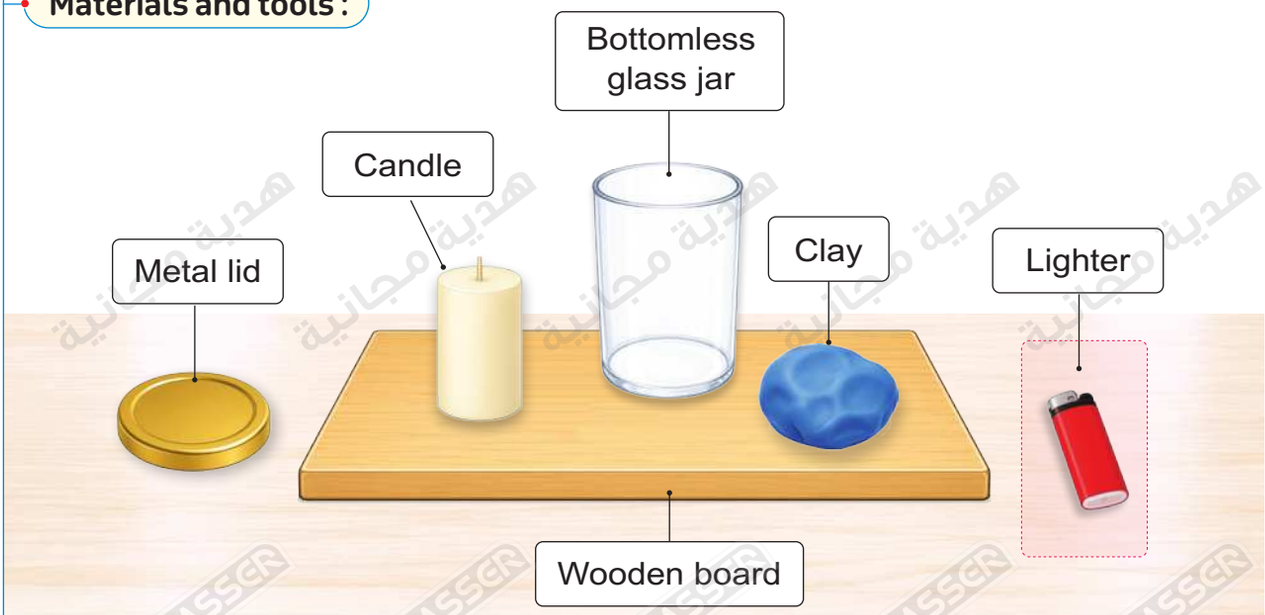
It is a reaction (combination) that occurs between oxygen and a substance that produces heat and light.

▸ To know the role of air in the occurrence and continuation of burning, we do the following activity:

## Activity

The role of air in burning things.

**Materials and tools :**




**Caution :**

Only the teacher should use the lighter to light the candle.

| | | | | | |
|---|---|---|---|---|---|
| burning | احتراق | combustion | احتراق | reaction | تفاعل |
| continuation | استمرار | occurrence | حدوث | substance | مادة |
| bottomless glass jar | وعاء زجاجى مفتوح الطرفين | lighter | ولاعة | metal lid | غطاء معدنى |



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## Steps and Observations :

1. Spread the clay on the wooden board and fix the candle on the clay, then ask your teacher to light it.

2. Cover the candle with the bottomless glass jar and leave the top of the jar open.

3. Close the jar by placing the metal lid on its opening.

**Observation**

The flame gradually weakens and the candle goes out after a short time.

4. Repeat the previous steps while making a small gap at the bottom of the jar in the clay.

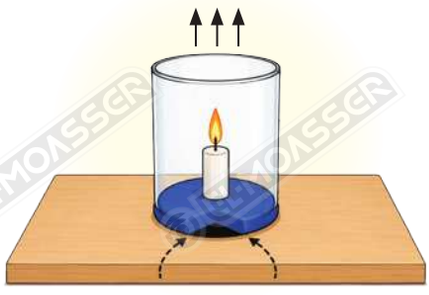
**Observation**

The candle flame goes out after a slightly longer time.

5. Take off the top metal lid, so that there is a gap at the bottom of the jar and a gap at the top of the jar.

**Observation**

The candle flame continues to burn.



| | | | | | |
|---|---|---|---|---|---|
| gradually | تدريجيًا | slightly | قليلًا | gap | فجوة |
| flame | لهب | weakens | يضعف | continues | يستمر |
| goes out | ينطفئ | | | | |



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## Explanation :

### 1 In case of the closed jar.

- The air inside the jar is used up, and once it runs out the candle goes out.

### 2 In case of the open jar with a bottom opening and a top opening.

- The air is constantly renewed (replaced) from the outside surroundings, allowing the candle to continue in burning.

## Conclusion

① Air has a role in burning.
② One of the most important conditions for things to continue in burning is that fresh air must constantly flow in and out.
③ In a place where air is not renewed, things cannot continue in burning.

| | | | | | |
|---|---|---|---|---|---|
| used up | نفد / استهلك | renewed | يتجدد | constantly | استمرار |
| replaced | يستبدل | conditions | ظروف | fresh air | هواء متجدد |



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## Questions of El-Moasser Book

**1** What happens when closing a glass jar containing a lit candle?

.....

**2** Put (✓) or (✗):

① For things to keep burning, fresh air must constantly flow in and out. (  )

② The flame burns stronger in case of a candle burning in the air than burning it in a closed bottle. (  )

**3** Choose the correct answer:

A lit candle goes out faster when it is placed .....

ⓐ on a table in the open air.

ⓑ in a glass jar open from the top only.

ⓒ in a glass jar open from the top and bottom.

ⓓ in a closed glass jar.

**4** What is meant by burning ?

.....

**5** Look at the opposite figure, then answer:

What happens to the candle flame after a period of time?

.....

.....

.....

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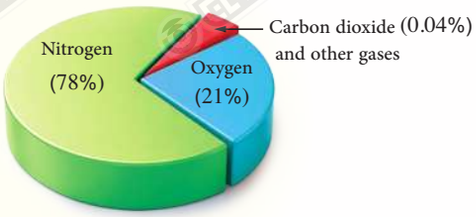
CHAPTER 1 LESSON 2

# The Role of Oxygen

**Atmospheric air** consists of a mixture of several gases present in different percentages, some of these gases differ in their effect on the flame and the continuation of burning ,as follows:




Components of atmospheric air

**Oxygen gas**

Its percentage in the atmospheric air is about **21%**

It helps in continuation of burning.

**Nitrogen gas**

Its percentage in the atmospheric air is about **78%**

It does not help in burning.

**Carbon dioxide gas**

Its percentage in the atmospheric air is about **0.04%**

It does not help in burning.

▸ To know the effect of these gases on burning, we do the following activity:

## Activity

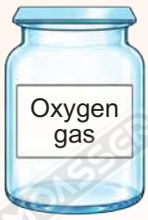
The effect of different gases on burning.

### Materials and tools

Lighter

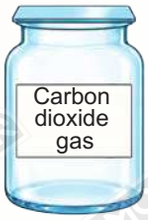
Candle

Combustion spoon



A tightly closed glass jar containing oxygen gas

A tightly closed glass jar containing nitrogen gas



A tightly closed glass jar containing carbon dioxide gas

| | | | | | |
|---|---|---|---|---|---|
| role | دور | components | مكونات | atmospheric air | الهواء الجوى |
| mixture | خليط | percentage | نسبة | continuation | استمرار |
| tightly | بإحكام | combustion spoon | ملعقة احتراق | | |



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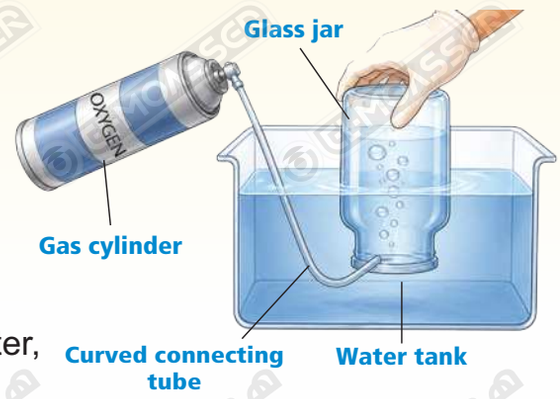
**Take care :**

- Before starting the steps of this activity, you must first learn how to collect the gases inside the three glass jars.

1. Fill the glass jar with water, then turn it upside-down inside the water tank (as shown in the opposite figure).
2. Pass the gas from the gas cylinder through the curved connecting tube into the upside-down glass jar until it is filled to about 70% with the gas instead of water, then put the lid on directly.




## Steps and Observations

1. Put a candle on a stand and ask your teacher to light it.

2. Quickly insert the lit candle inside the oxygen gas jar and then put the lid on.

**Observation**

The burning of the candle flame increases, becomes stronger and brighter, and goes out after a long period of time.

3. Repeat the previous step with the nitrogen gas jar.

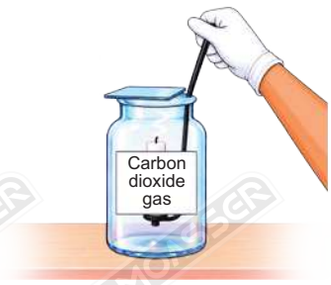
**Observation**

The candle flame gradually weakens and then goes out.

4. Repeat step number 2 with the carbon dioxide gas jar.

**Observation**

The candle flame goes out quickly.




**Conclusion**

The effect of the different gases making up atmospheric air on burning differs, as:

- Oxygen helps things in burning.
- Nitrogen and Carbon dioxide do not help things in burning.

| | | | | | |
|---|---|---|---|---|---|
| upside down | مقلوب | instead of | بدلًا من | curved connecting tube | أنبوب توصيل منحنى |



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## First Questions of El-Moasser Book

**1** **If you have three bottles, a bottle with oxygen gas, a bottle with nitrogen gas, and a bottle with carbon dioxide gas, what do you expect to happen to a lit incense stick when inserted into each bottle ?**

| The gas inside the bottle | Your expectation of what happens to the lit stick |
|---|---|
| 1. Oxygen : | ..... |
| 2. Nitrogen : | ..... |
| 3. Carbon dioxide : | ..... |

**2** **Complete:**

The gases that don't help in burning are ..... and ..... gases.

**3** **Put [✓] or [✗] :**

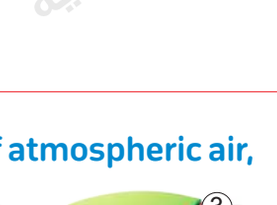
The gas that helps in burning is present in the highest percentage in the components of atmospheric air. ( )

**4** **Choose the correct answer :**

Which of the following statements is true about the burning of the candle flame ? .....

ⓐ Oxygen increases it and carbon dioxide extinguishes it.
ⓑ Oxygen extinguishes it and nitrogen increases it.
ⓒ Nitrogen increases it and carbon dioxide extinguishes it.
ⓓ Nitrogen extinguishes it and oxygen extinguishes it.

**5** **Look at the opposite figure that represents the components of atmospheric air, then complete:**




① Number ① represents ..... gas,
its percentage in atmospheric air is about .....
② Number ② represents ..... gas, its percentage in atmospheric air is about .....
③ Number ③ represents ..... gas, its percentage in atmospheric air is about .....



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## Second Questions of the School Book Lessons 1 & 2

### A Try

**1** ① **In the experiment of burning a standing candle inside a jar, what happens to the flame if you put a lid on the jar to stop air from coming in and out?**

.....

② **Why did the flame go out inside the jar with the lid ? Choose the correct answer from below.**

ⓐ Because there was no water vapor in the jar.
ⓑ Because it got dark inside the jar.
ⓒ Because fresh air stopped coming in.

**2** ① **What gas is included in the air and has the power to help things burn ?**

(.....)

② **What happens to the burning when you put a lit incense stick into a jar of oxygen ? Choose the correct answer from below.**

ⓐ It becomes weaker. ⓑ It burns brightly. ⓒ The flame goes out.

③ **What happens to the burning when you put a lit incense stick into a jar of carbon dioxide? Choose the correct answer from below.**

ⓐ It keeps burning as it is. ⓑ It burns brightly. ⓒ The flame goes out.

### B Exercise

**1** ① **In the experiment of burning a candle inside a jar, what happens to the flame if you leave gaps at the top and bottom of the jar? Choose the correct answer from below.**

ⓐ It keeps burning. ⓑ It goes out immediately.

② **Fill in the blanks with the correct words:**

① For things to keep burning, fresh ..... must constantly flow in and out.
② In a place where air is not replaced, things ..... keep burning after a period of time.

**2** ① **What happens to the burning when you put a lit incense stick into a jar of nitrogen ? Choose the correct answer from below.**

ⓐ It keeps burning as it is. ⓑ It burns brightly. ⓒ The flame goes out.

② **Which statement correctly explains oxygen? Choose the correct answer from below.**

ⓐ Oxygen makes up about 78% of the air.
ⓑ Oxygen helps things burn.
ⓒ When you put a candle in a jar with oxygen, the flame goes out immediately.



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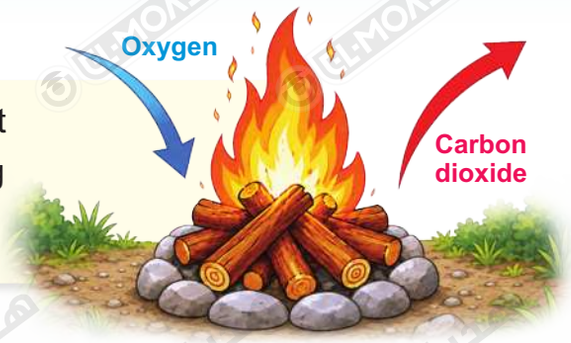
CHAPTER 1 LESSON 3

# Air After Burning

You have learned from the previous lesson that oxygen gas and carbon dioxide gas are among the components of atmospheric air.




**After things burn, the composition of the air surrounding them does not remain the same but its components change, as during burning:**

A part of the **oxygen** gas present in the air is used up, so its amount decreases.

At the same time, **carbon dioxide** gas is produced in the air, so its amount increases.

## Detecting carbon dioxide gas

- We can detect the increase in the amount of carbon dioxide gas produced after burning using clear limewater.

**What is meant by Limewater**

It is a colorless clear liquid that turns into milky white when it reacts with carbon dioxide gas.

## Activity

Detecting carbon dioxide gas using clear limewater.

**Materials and tools :**

Two glass jars

Safety goggles

Candle

Clear limewater

Lighter

Candle stand

| | | | | | |
|---|---|---|---|---|---|
| composition | تركيب | limewater | ماء الجير | colorless | عديم اللون |
| safety goggles | نظارات حماية | | | | |



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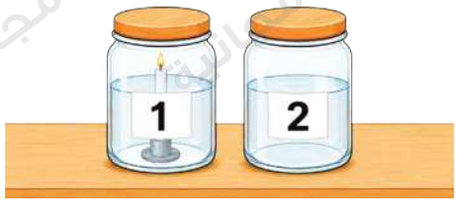
**Caution:**
Safety goggles are important in this activity to protect the eyes from limewater.

## Steps

1. Put on safety goggles and then put an equal amount of limewater in the two jars (1) and (2)

2. Insert a lit candle into jar (1) , then put the lid on and wait until the flame goes out.




3. Take out the candle and shake the two jars.

## Observation

**In jar (1)**

The clear limewater becomes milky white.

**In jar (2)**

The limewater remains clear as it is without change.

## Conclusion

Burning produces carbon dioxide gas and its percentage increases in the air surrounding the burning object, which leads to changing the color of the clear limewater to milky white.

| | | | | | |
|---|---|---|---|---|---|
| insert | أدخل | take out | أخرج | shake | رج |
| remain | يبقى | produce | ينتج | | |



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## First Questions of El-Moasser Book

**1 Write the scientific term :**

A colorless clear liquid that turns into milky white when it reacts with carbon dioxide gas. (.....)

**2 Complete the following table using the following words :**

increases – decreases – large – turns milky white – does not turn milky white – small

| Points of comparison | The amount of oxygen gas | The amount of carbon dioxide gas |
|---|---|---|
| Air before burning : | ..... | ..... |
| Air after burning : | ..... | ..... |
| The effect on limewater : | ..... | ..... |

**3 Give reasons for :**

① The composition of the air surrounding a candle change when it burns.

.....

② The amount of carbon dioxide gas in the air increases as a result of burning.

.....

**4 What is the importance of :**

Limewater: .....

**5 Complete the following sentences :**

① When things burn, a change occurs in the composition of the ..... surrounding them.

② The gas consumed by the flame and its amount decreases in the surrounding air is ..... gas.



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## A Try

**1 Answer the following questions about the air after things burn.**

ⓐ What gas has increased? (.....)

ⓑ What gas has decreased? (.....)

**2 What is the colorless and clear liquid used to check if there is carbon dioxide?**

(.....)

## B Exercise

**1 What happens when you put limewater in a jar with increased carbon dioxide and shake it? Choose the correct answer from below.**

ⓐ It turns blue. ⓑ It turns yellow. ⓒ It turns milky white.

**2 How does the amount of oxygen change after burning?**

.....

**3 How does the amount of carbon dioxide change after burning?**

.....

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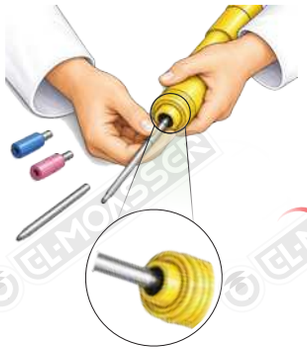
# LET'S EXPAND!

## Tools used to check gases

### 1 Gas Detector Tube :

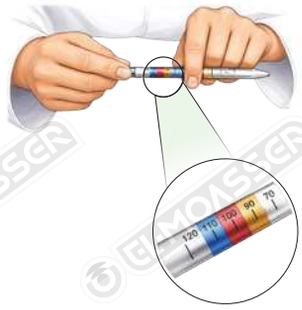
- It consists of a glass tube inside which there is a chemical substance that changes its color when it reacts with a specific gas.
- The type of chemical substance inside the tube used to measure the amount of oxygen gas differs from the type of chemical substance inside the tube used to measure the amount of carbon dioxide gas.
- By reading the scale at the position where the color changes, you can measure the amount of the gas.

#### How to use



1 Break off both ends of the glass tube, then insert it firmly into the gas sampling pump.

2 Pull the handle of the pump completely, and wait for a certain period of time, until the chemical substance inside reacts and changes its color.



3 Read the number at the border where the color changed, this value represents the percentage of the gas present in the air sample.

**Caution:**

- The glass tube is single-use only.
- Be careful not to get hurt by the broken ends.

### 2 Gas Monitor :

- It uses a sensor to show the percentage (%) of the gas on the screen in digital numbers.
- There are types that can measure both oxygen and carbon dioxide at the same time, which makes them very useful.

| | | | | | |
|---|---|---|---|---|---|
| tools | أدوات | check | فحص | gas detector tube | أنبوب كشف الغاز |
| chemical substance | مادة كيميائية | specific | معين | measure | قياس |
| scale | تدريج | firmly | إحكام | border | حد |



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# Enrichment Corner

Combustion (Burning) and Future Energy

## 1 The Discovery of Fire and Egyptian Civilization :

Learning to use fire was a major step in the development of human civilization.

- **Lighting in ancient times :**

Ancient Egyptians used to burn vegetable oil extracted from plants grown on the banks of the Nile River, as well as animal fats; to light houses, temples, and pyramids, and they used clever ideas to reduce smoke; which shows their wisdom regarding reducing air pollution.

- **The Role of Oxygen in Combustion :**

When there is plenty of oxygen, things burn intensely. Ancient craftspeople used a bellows (a tool for blowing air) to pump air into the fire to supply it with more oxygen; which led to melting gold at high temperatures to make jewelry.

## 2 Ways to Reduce Carbon Dioxide Gas Emissions :

Burning of things produces carbon dioxide gas, and today the presence of very large amounts of this gas is considered one of the causes of "Global warming".

- **Renewable energy :**

Instead of burning oil and coal, Egypt is heading towards increasing the use of renewable energy resources, such as the Sun and wind to generate energy without the need to burn fuel.

- **Benban Solar Park :**

Benban Solar Park in Aswan is considered one of the largest solar energy projects in the world, where it generates electricity using sunlight without burning fuel, which reduces carbon dioxide gas emissions.

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# CHAPTER 1 SUMMARY

**Burning:** It is a reaction (combination) that occurs between oxygen and a substance that produces heat and light.

**• The role of air in burning things:**

| In case of the closed jar | In case of the open jar with a bottom opening and a top opening |
|---|---|
| The air inside the jar is used up, and once it runs out the candle goes out. | The air is constantly renewed (replaced) from the outside surroundings, allowing the candle to continue in burning. |

- Air has a role in burning.
- One of the most important conditions for things to continue in burning is that fresh air must constantly flow in and out.
- In a place where air is not renewed, things cannot continue in burning.

**• Components of atmospheric air:**

| Oxygen gas | Nitrogen gas | Carbon dioxide gas |
|---|---|---|
| Its percentage in the atmospheric air is about 21 % | Its percentage in the atmospheric air is about 78 % | Its percentage in the atmospheric air is about 0.04 % |
| It helps in continuation of burning. | It does not help in burning. | It does not help in burning. |

**Limewater:** It is a colorless clear liquid that turns into milky white when it reacts with carbon dioxide gas.

- During burning, the amount of oxygen gas present in the air decreases, while the amount of carbon dioxide gas produced in the air increases.
- Clear limewater is used to detect the increase in the amount of carbon dioxide gas produced after burning.
- Carbon dioxide gas changes the color of the clear limewater into milky white.

**Review on Chapter 1**

To review this chapter look at the **Assessment Book** "Part 3 : Final Revision".

**In the Assessment Book :**

**Try to answer :**

- Test (1) [ in part (1) ]
- Weekly Assessment (1) [ in part (2) ]



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# General Exercises

## ON CHAPTER 1

Answered

Questions signed by (📄) are taken from the "Performances and Assessments Book"

**1 Choose the correct answer :**

1. The gas that the flame uses up during burning is ..... gas.
   ⓐ nitrogen ⓑ oxygen ⓒ carbon dioxide ⓓ water vapor

2. What happens to a burning candle when it is covered with a glass jar and completely closed? .....
   ⓐ It burns brighter.
   ⓑ It goes out after a very long time.
   ⓒ It goes out after a short time.
   ⓓ Its flame remains the same.

3. When there are gaps in the jar at the top and bottom, the candle .....
   ⓐ goes out immediately. ⓑ goes out after a short time.
   ⓒ only emits black smoke. ⓓ keeps burning.

4. ..... gas helps burning to continue.
   ⓐ Oxygen ⓑ Nitrogen
   ⓒ Carbon dioxide ⓓ Water vapor

5. The percentage of nitrogen gas in atmospheric air is about .....
   ⓐ 21% ⓑ 78% ⓒ 87% ⓓ 0.04%

6. The process that leads to a decrease in the amount of oxygen and an increase in the amount of carbon dioxide is .....
   ⓐ cooling. ⓑ evaporation. ⓒ freezing. ⓓ burning.

7. The gas whose percentage increases in the air after the candle burns is .....
   ⓐ oxygen. ⓑ carbon dioxide.
   ⓒ nitrogen. ⓓ fresh air.

8. The liquid that is used to detect the presence of carbon dioxide gas is .....
   ⓐ distilled water. ⓑ salt solution.
   ⓒ limewater. ⓓ alcohol.

9. The color of limewater changes from colorless to milky white due to the .....
   ⓐ decrease in the amount of oxygen.
   ⓑ increase in the amount of nitrogen.
   ⓒ increase in the amount of carbon dioxide.
   ⓓ increase in the amount of oxygen.



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⑩ When comparing the air surrounding the candle before and after burning, we find that the amount of oxygen .....

ⓐ increases. ⓑ does not change.
ⓒ decreases. ⓓ increases then decreases.

⑪ What is the change in the composition of the air inside a closed jar when the candle inside it has gone out? .....

ⓐ It does not change.
ⓑ The percentage of nitrogen gas increases.
ⓒ The air becomes rich in oxygen.
ⓓ The percentages of its gases change.

## 2 Choose the correct answer :

① Among the gases that don't help in burning are .....

ⓐ oxygen. ⓑ carbon dioxide.
ⓒ nitrogen. ⓓ water vapor.

② Among the components of atmospheric air are .....

ⓐ oxygen. ⓑ nitrogen. ⓒ limewater. ⓓ carbon dioxide.

③ Among the tools (or substances) that can be used for detecting different gases are .....

ⓐ gas monitor. ⓑ saltwater. ⓒ limewater. ⓓ gas detector tube.

## 3 Put (✓) or (✗) :

① Burning is a reaction between oxygen and a substance that produces heat and light. ( )

② Things keep burning even if the place is closed and the air is not replaced. ( )

③ The gaps at the top and bottom of the jar allow a current of air to pass through, which helps burning to continue. ( )

④ Fresh air flowing in from the outside is very necessary for the candle flame to stay lit. ( )

⑤ When there is only a gap at the top and the bottom of a jar that is completely closed with clay, the flame remains strong. ( )

⑥ Atmospheric air consists of a mixture of different gases with the same percentages. ( )

⑦ Atmospheric air has a role in burning. ( )

⑧ Nitrogen gas doesn't help in burning. ( )



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⑨ The percentage of carbon dioxide gas in atmospheric air is about 21% ( )

⑩ Limewater is used to detect the decrease in the amount of oxygen gas. ( )

⑪ In gas detector tube, there is one chemical substance used for detecting both carbon dioxide and oxygen gases. ( )

## 4 Correct the underlined words :

① The gas that helps burning in the atmospheric air is nitrogen gas. (.....)

② Burnt air is what replaces the lack of oxygen inside a jar contains a burning candle to keep it lit. (.....)

③ The percentage of carbon dioxide gas in atmospheric air is about 78% (.....)

④ In a jar containing oxygen gas, the flame gradually weakens until the candle goes out. (.....)

⑤ The percentage of nitrogen gas increases in the air as a result of burning. (.....)

⑥ We use alcohol to detect the presence of carbon dioxide gas. (.....)

⑦ Limewater changes from a clear liquid to a blue color when shaken with the products of burning. (.....)

⑧ Gas detector tube uses a sensor to show the percentage of the gas on the screen in digital numbers. (.....)

## 5 Complete the following sentences using these words:

**[You may use the same word more than once].**

**(carbon dioxide – limewater – oxygen – air – hydrogen – nitrogen)**

① For things to keep burning, fresh ..... must constantly flow in and out.

② ..... gas helps burning, while ..... gas and ..... gas do not help in burning.

③ During burning, a part of the ..... gas present in the surrounding air is consumed, and at the same time ..... gas is formed as a product of burning, and its formation is indicated by the turbidity of .....



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## 6 Write the scientific term of each of the following:

1. A reaction between oxygen and a substance that produces heat and light. (.....)
2. A mixture of several gases that surrounds us and is necessary for burning. (.....)
3. The gas present in the air which the flame uses up to keep burning. (.....)
4. One of the gases in the atmospheric air that helps in burning. (.....)
5. The gas whose percentage decreases in the air inside the jar after burning. (.....)
6. The gas whose percentage increases in the air as a result of burning things. (.....)
7. A colorless clear liquid that turns into milky white when it reacts with carbon dioxide gas. (.....)
8. The gas produced from burning the candle that turns limewater into milky white. (.....)

## 7 Complete the following sentences:

1. For things to keep burning, ..... must constantly flow in and out.
2. The gas necessary for burning which is present in the atmospheric air is ..... gas.
3. When the jar is opened at the top and completely closed at the bottom, the candle ..... gas.
4. If the air around the flame is not replaced, ..... gas is used up causing the flame to go out.
5. The percentage of ..... gas in atmospheric air is about 78%, while that of oxygen gas is about ..... and that of carbon dioxide gas is about .....
6. In a jar containing ..... gas, the burning of the candle flame increases, becomes ..... and ..... and goes out after a long period of time.
7. When things burn, a change occurs in the composition of the ..... surrounding them.
8. The gas consumed by the flame and its amount decreases in the surrounding air is ..... gas.
9. The percentage of ..... gas increases in the air as a result of burning.
10. We use ..... to detect the presence of carbon dioxide gas after a burning candle goes out.



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⑪ Limewater changes from a colorless to a ..... color when it reacts with carbon dioxide gas.

⑫ Among the tools that are used to check gases are ..... and .....

⑬ Inside the gas detector tube, the color of the ..... substance inside its glass tube changes when it reacts with a specific gas.

## 8 Give reasons for :

① The burning candle goes out inside a closed jar.

.....

② The candle flame keeps burning when it is placed in an open jar.

.....

③ The flame goes out in the places where the air is not replaced.

.....

④ Atmospheric air has a role in burning.

.....

⑤ The flame gradually weakens until the candle goes out in a jar containing nitrogen gas.

.....

⑥ In a jar containing carbon dioxide gas, the candle flame goes out quickly.

.....

⑦ The amount of oxygen gas decreases during burning.

.....

⑧ Clear limewater is used to detect carbon dioxide gas.

.....

## 9 What happens ...?

① When leaving the jar open at the top and the bottom while the candle is burning.

.....

② When using up all the air inside a closed jar that has a burning candle.

.....

③ When placing a burning candle inside a jar that is completely closed at the bottom and open at the top.

.....

④ When placing a burning candle in a jar containing oxygen gas.

.....



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⑤ When placing a burning candle in a jar containing nitrogen gas.

.....

⑥ When placing a burning candle in a jar containing carbon dioxide gas.

.....

⑦ To the composition of the air surrounding the candle when it burns.

.....

⑧ To the amount of oxygen gas inside a closed jar during burning.

.....

⑨ To the amount of carbon dioxide gas in the air after the candle goes out.

.....

⑩ To limewater when carbon dioxide gas passes through it.

.....

## 10 What is meant by (Define):

① Burning: .....

② Limewater: .....

## 11 Compare between:

| Composition of air before burning | Composition of air after burning |
|---|---|
| ..... | ..... |
| ..... | ..... |

## 12 What is the importance of :

① Oxygen gas for a burning candle: .....

② Limewater: .....

③ Gas monitor: .....

## 13 Give one example of each of the following:

① A gas helps in burning. (.....)

② A gas produced during burning. (.....)

③ A gas doesn't help in burning. (.....)

④ A liquid used to detect the presence of carbon dioxide gas. (.....)



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**14** **Look at the opposite figure, then answer:**

① What happen to the candle flame after covering the jar with a metal lid? And why ?

.....

② What gas is produced during burning of the candle?

.....

**15** **Look at the opposite two test tubes that contain limewater, then answer the following questions:**

① Which test tube contains limewater that reacted with carbon dioxide gas? (Give a reason for your answer)

.....

.....

(Test tube (1 (Test tube (2

② What happens if oxygen gas passes through limewater in test tube (2)?

.....

.....

**16** **In the opposite figures, compare between the effect of different gases on the candle flame :**

① The effect of carbon dioxide gas :

.....

② The effect of oxygen gas :

.....

③ The effect of nitrogen gas :

.....

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